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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/568,750	02/21/2006	Takuya Tsukagoshi	127113	6667
25944 7590 07/29/2008 OLIFF & BERRIDGE, PLC P.O. BOX 320850 ALEXANDRIA, VA 22320-4850				
EXAMINER				
CHU, KIM KWOK				
ART UNIT		PAPER NUMBER		
2627				
MAIL DATE		DELIVERY MODE		
07/29/2008		PAPER		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/568,750

Applicant(s)

TSUKAGOSHI ET AL.

Examiner

KIM CHU

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on Pre-Amendment filed on 2/21/2006.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-2 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2 is/are allowed.
- 6) ☒ Claim(s) 1-4 is/are rejected.
- 7) ☒ Claim(s) 5-7 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/S508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Claim Objection

1. Claim 2 is objected to because of the following informalities:

(a) in claim 2, line 11, the term "first recording beam" should be changed to --first recording beam set--.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claim 2 is ejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

(a) in Claim 2, lines 11 and 12, the phrase "bringing the first recording beam back to an original position in the following recovery time" is vague. First the limitation "original position" is not defined and therefore it is not clear where the beam is move back; and second, the term "following recovery time" is not clear as what is the recovery time". Applicant should clarify this by referring the recovery time of

a tracking mirror as disclosed in the specification, sections 3 and 4.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. § 102 that form the basis for the rejections under this section made in this Office action:

*A person shall be entitled to a patent unless -
(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.*

5. Claims 1-3 are rejected under 35 U.S.C. § 102(e) as being anticipated by Tachibana et al. (U.S. Publication NO. 2005/0237896).

6. Tachibana teaches holographic recording method having all of the steps as recited in claim 1. For example, Tachibana teaches the following:

(a) with respect to Claim 1, forming a laser beam 12 into a collimated beam having an expanded diameter and then dividing the diameter into an object beam 12A and a reference beam 12B (Fig. 13; laser source 11 inherently irradiates a collimated beam in form of a plurality of diverse beams); modulating (by encoder 25) the divided object beam 12A according to information to be recorded (Fig. 13; page 3, section 48, lines 1-3); making

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these object and reference beams 12A, 12B incident on the reflective surface of a rotating polygon mirror 23B (Fig. 15; page 7, section 88), while maintaining collimated beam shapes and being adjacent to each other, through a condenser lens 27 having a focal point behind the reflective surface of the polygon mirror (Figs. 13 and 15); and moving the object and reference beams 12A, 12B reflected on the reflective surface in a scanning direction determined by the angle change of the reflective surface (Fig. 15), and meanwhile making the object and reference beams incident on the holographic recording medium 50 moving in the same direction as the scanning direction with angles different from each other so as to interfere with each other within the holographic recording medium (Fig. 15; an optical pattern is formed on the recording medium by the interference of object light 12A and reference light 12B).

7. Tachibana teaches holographic recording method having all of the steps as recited in claims 2 and 3. For example, Tachibana teaches the following:

(a) with respect to Claim 2, driving (rotating) a holographic recording medium 50 (Fig. 13), and meanwhile irradiating a first recording beam 12 comprising one recording beam set from among multiple recording beam sets in the recording time while moving substantially in synchronization with and in the same direction as the holographic recording medium (Fig. 15; recording mode where the recording beam set must synchronize such as speed to the rotation of the recording medium), the one recording beam set comprising an object beam 12A and a reference beam 12B forming an interference fringe on the holographic recording medium (Fig. 13); bringing the first recording beam back to an original position in the following recovery time (recording with the a recording beam again in the starting position/address of the medium 50); and irradiating at least a second recording beam (another recording light beam which is reflected by a polygon mirror 23B as in Fig. 15) comprising one recording beam set from among the remaining multiple recording beam sets in the recovery time (next reflection by the polygon mirror) of the first recording beam while moving substantially in synchronization with and in the

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same direction as the holographic recording medium (Fig. 15; an optical pattern is formed on the recording medium by the interference of object light 12A and reference light 12B).

(b) with respect to Claim 3, the multiple recording beam sets 12 are irradiated to the holographic recording medium 50 while being alternately offset either in the driving direction of the holographic recording medium or in the direction orthogonal to the driving direction (Figs. 13 and 15; beams irradiated to the recording medium are offset in the driving/tracking direction at an angle or perpendicular to the tracking direction).

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. § 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 4 is rejected under 35 U.S.C. 103 (a) as being unpatentable over Tachibana et al. (U.S. Publication NO. 2005/0237896) in view of Cho (U.S. Patent 6,972,982).

Tachibana teaches a holographic recording apparatus very similar to that of the present invention. For example, Tachibana teaches the following:

(a) with respect to Claim 4, a recording medium driver 33 for driving a holographic recording medium 50 capable of recording an interference fringe of incident object and reference beams 12A, 12B (Fig. 13); a laser light source 11; a beam expander 14 for expanding a laser beam emitted from the laser light source 11 to form a collimated beam having an expanded beam diameter (Fig. 13); a collimated beam divider 13 for dividing the laser beam; a polygon mirror 23B (Fig. 15) that is freely rotatable; a condenser lens 27 having a focal point that allows an incident collimated beam to be focused behind the

reflective surface of the polygon mirror (Fig. 13); an object optical system (13, 21, 17 etc.) and a reference optical system (18, 19 etc.) for guiding one of the divided collimated beams as an object beam 12A and the other as a reference beam 12B to the condenser lens 27 as incident collimated beams (Fig. 13); a scanning optical system 32A (Figs. 13 and 15) for guiding the object and reference beams reflected on the reflective surface of the rotating polygon mirror to the holographic recording medium 50 while controlling the scanning direction determined by the rotation of the polygon mirror to match the moving direction 20 of the holographic recording medium (Fig. 13; page 7, section 88) and a spatial light modulator 15, disposed in the object optical system, for modulating the object beam according to information to be recorded (Fig. 13), wherein the object optical system and the reference optical system are configured so that the object and reference beams 12A, 12B are integrated so as to maintain collimated beam shapes and be adjacent to each other without overlapping, and are made incident on the condenser lens 27 with substantially the same beam shape as the collimated beam Fig. 15; an optical pattern is formed on the recording medium by the interference of object light 12A and reference light 12B).

However, Tachibana does not teach the following:

(a) the collimated beam divider 13 for dividing the beam diameter of the collimated beam expanded by a beam expander (beam divider is positioned before beam expander).

Cho teaches a holographic recording apparatus having the following features"

(a) the collimated beam divider 106 for dividing the beam diameter of the collimated beam expanded by the beam expander 104 (Fig. 1A; beam divider is positioned after beam expander).

Tachibana places a beam expander after a beam divider so that only the object light's diameter is enlarged. However, there is an alternative arrangement to place the beam expander in front of the beam divider so that all the divided beams are expanded such as Chao's Fig. 1A. Hence, when the beam expansion is not limited to the object beam, it would have been obvious to one of ordinary skill in the art to place the beam expander in front of the beam divider such as Chao's so that all beams irradiates from a light source are enlarged before the beams are splitted into groups of light beams.

Allowable Subject Matter

10. Claim 8 is allowable over prior art.
11. Claims 5-7 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
12. The following is an Examiner's statement of reasons for the indication of allowable subject matter:

As in claim 5, the prior art of record fails to teach or fairly suggest a holographic recording apparatus having following feature:

(a) the scanning optical system is configured as a 4f-optical system.

As in claim 6, the prior art of record fails to teach or fairly suggest a holographic recording apparatus having following feature:

(a) wherein the scanning optical system includes an f- θ lens which refracts the object and reference beams reflected by the polygon mirror such that when an angle between an optical axis of the polygon mirror and a central optical axis of the f- θ lens is θ , the refracted object and reference beams are parallel to the central optical axis of the f- θ lens along an

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optical axis whose distance from the central optical axis of the f- θ lens is proportional to the θ .

As in claim 8, the prior art of record fails to teach or fairly suggest a holographic recording apparatus having following features:

(a) a light shutter, disposed in a reference optical system that guides the reference beam in each of the recording beam optical systems, for blocking the reference beam independently; and

(b) the recording beam optical systems are sequentially provided with a first tracking mirror, a second tracking mirror, and so on, the first tracking mirror reflecting a first recording beam in a first recording beam optical system from among the multiple recording beam optical systems and moving the reflection point of the first recording beam, the second tracking mirror reflecting a second recording beam, which is guided by a second recording beam optical system from among the multiple recording beam optical systems, and the first recording beam, which is reflected from the first tracking mirror, toward the holographic recording medium and moving the reflection points of the second recording beam and the first recording beam in parallel with the reflection point on the first tracking mirror.

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The features indicated above, in combination with the other elements of the claims, are not anticipated by, nor made obvious over, the prior art of record.

Related Prior Art

13. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Edwards (7,088,481) is pertinent because Edwards teaches a 4f optical system in a holographic recording system.

Fuji (5,465,248) is pertinent because Fuji teaches a polygon mirror in a holographic recording system.

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14. Any inquiry concerning this communication or earlier communication from the examiner should be directed to Kim CHU whose telephone number is (571) 272-7585 between 9:30 am to 6:00 pm, Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen, can be reached on (571) 272-7579.

The fax number for the organization where this application or proceeding is assigned is (571) 273-8300

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished application is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9191 (toll free).

/Kim-Kwok CHU/

Examiner AU2627

July 20, 2008

(571) 272-7585

/HOA T NGUYEN/

Supervisory Patent Examiner, Art Unit 2627

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